

# EAST FACE ANALYSIS

## SILVICULTURAL EFFECTS OF THE ALTERNATIVES

### Introduction

There are several factors in the East Face Analysis Area that affect overall integrity as described by the Watershed Restoration and Prioritization Process (WRAPP) developed by the Wallowa-Whitman National Forest (2002). Stressors indicated by WRAPP include Fire Regime, Insect and Diseases, Noxious Weeds, Road/Stream Connectivity, and Road/Wildlife Security. The risks of fire and insect/diseases are major silvicultural concerns to implementing the Wallowa-Whitman Forest Plan and ecosystem management. To restore and maintain the landscape, silvicultural means should be used to modify and rejuvenate the forested landscape in the analysis area.

Insects and diseases can cause growth reduction, mortality, defect and decay. On an ecosystem health basis a certain level of tree insect/disease activity is expected (Schmitt 1994). Trees may be predisposed to attack by insects or diseases by various factors including fire, overstocking, and the existing level of insects and diseases. Stand density is one of the most important factors influencing certain insect populations; dense stands increase tree competition, which increases stagnation and development of a suppressed class of trees, which can lead to outbreaks (Scott 1996). Another important factor to spread of insects/diseases is species composition. Current philosophy is to manage the level of insects/diseases and their affects, to within the range that is believed historical (Schmitt 1994). Most root diseases are believed to have increased in their virulence and occurrence in the Blue Mountains (Schmitt 2001).

Many stands in the East Face Planning Area have suppressed and intermediate trees and stocking levels exceed recommended numbers in stands across all potential vegetation groups. Overstocking and poor tree conditions can lead to an increase in beetle populations, reduced health of the stand, decreases in production of both the overstory and understory, and alter stand structures and compositions. In many instances, stress, particularly drought stress is compounded by overstocking (Fiddler et al., 1995). This stress can lead to losses in tree growth and increases in insect and disease caused mortality. Appropriate stocking levels can help to increase tree growth and fire, insect, disease resistance of stands (Lambert 1994). The number of stands treated would measure the effectiveness of the alternatives towards reducing stand density and changing species composition.

### Analysis Assumptions

The project area is in the geographical province of the Blue Mountains, approximately 12 miles from La Grande, Oregon. The 47,636 acre project area is the analysis area for analysis of direct and indirect effects. The cumulative effects analysis will include, subwatersheds 17070202010(Baldy Creek-North Fork John Day River), 170601040303 (Jordan Creek), 170502030601(Upper Wolf Creek), 170502030502 (Middle North Powder River), 170601040601 (Upper Ladd Creek), 170601040301 (Upper Beaver Creek), 170502030505 (Lower North Powder River), 170502030503 (Upper Anthony Creek), 170502030504 (Lower Anthony Creek), and 170601040101 (Tanner Gulch-Grande Ronde River). Approximately 1,224 acres of Bureau of Land Management (BLM) is also part of the project area. The BLM will manage their land and the remaining acres are managed by the Wallowa-Whitman National Forest, La Grande Ranger District.

Prescriptions discussed in this document and used in timber stand treatments are as follows:

**HFU – Fuels Reduction With Commercial Removal.** Units would receive ladder and ground fuels reduction treatment using commercial biomass removal to accomplish fuel reduction objectives.

Canopy bulk densities would also be reduced using a commercial thinning from below prescription with additional slash busting, whip falling or precommercial thinning post harvest to achieve fuel reduction objectives.

**HIM – Improvement Harvest.** Prescription cutting made in stands for the purpose of improving the composition, quality, and structure by removing trees of undesirable species, form or condition from the main canopy.

**HPR – Partial Overstory Removal.** Prescription cutting that removes older trees that overtop a more desirable younger stand.

**HPO – Patch Openings.** Prescription cutting that removes portion of a stand to alter species composition and to create more resilient and resistant stands. Treatments will create conditions that will encourage higher amounts of early and mid seral tree species (ponderosa pine, western larch, and western white pine) and decrease the amount of grand fir, Engleman spruce, and subalpine fir.

**HSA – Sanitation Harvest.** This silvicultural prescription removes diseased and insect damaged trees and associated trees with a high potential to become infected.

**HSB – Shelterwood.** Prescription treats a stand of trees through a series of cuttings designed to facilitate establishment of a new cohort of trees. Due to site conditions, scattered overstory trees are retained to provide some shade or site protection for the regenerating stand beneath it. Once established, the overstory trees can be removed to promote maximum growth and development of the regenerated understory, or retained for structural or habitat needs.

**HTH – Thinning Harvest.** Prescription is generally a “thin from below” designed to reduce competition for site nutrients and concentrate growth potential on trees left on site. This is accomplished by removing smaller over-topped trees and some poor crowned intermediates/co-dominants which compete for site resources and creating ladder fuels into the crowns of the best quality trees which would remain on site.

**FFU – Fuels Reduction without Commercial Removal.** FFU units are within stands needing treatment due to overstocked conditions and high fuel loads. Units would receive ladder and ground fuels reduction treatment involving precommercial thinning of live trees less than nine inches dbh to a spacing of 16 feet using a combination of a slashbuster on slopes < 30% and hand treatment with chainsaws on slopes > 30%. Ladder fuels branches on trees up to six feet above ground would be pruned, and slash would be piled by hand or grapple piled and burned.

**PCT - Precommercial thinning** thinning of smaller diameter selected trees in a young stand to stimulate the growth of the remaining trees. May be accomplished by manual or mechanical (slash buster) methods.

## **Potential Vegetation Types**

Ninety-one percent of National Forest System lands in the East Face analysis area are forested. When classified using potential vegetation groups (PVG), approximately forty-three percent of the forested acres are “moist upland forest”, thirty-seven percent are “cold upland forest” and twenty percent of these forested lands are “dry upland forest” (Table 1).

**Table 1 - Potential vegetation groups (PVG) of the Eastface forested analysis area**

PVG	Acres	Percent
Moist Upland Forest	19,033	43
Dry Upland Forest	8,093	20
Cold Upland Forest	16,055	37
Total	43,181	

Current prescriptions focus on managing stands within a range of desired densities. The lower range or lower management zone (LMZ) would maintain stocking at a point where a significant portion of the site resources are captured in tree growth. The upper range of density or upper management zone (UMZ) prevents the establishment of a suppressed tree class to develop. Stands near or above the UMZ are more likely to develop stress, be less vigorous, and contain more mortality.

According to the Intergovernmental Panel on Climate Change, there has been a clear pattern of temperature increases and long-term trends in precipitation changes (Kimbell 2007). The panel concludes that disturbances from pest, diseases, and fire are projected to have increasing impacts on forests. Climate change most typically is predicted to increase fire, drought, and greater vulnerability to insects and diseases in forests (Brown 2008). Insect life cycles are highly sensitive to temperature; climate change can have a large impact on the development, survival, and distribution of insects (Mock et.al. 2007, Redmond 2007, Brown 2008). Recent warming trends have caused mountain pine beetle infestations in areas that have not previously recorded outbreaks in British Columbia and this increase has occurred largely in part due to a shift in climate (Carroll 2004, Beukema et.al. 2007).

The impacts of climate change on most terrestrial ecosystems are expected to occur at a rate that will exceed the capacity of many plant and animal species to migrate or adapt (Kimbell 2007; Strategic Framework 2008) and create forests that are ill adapted to conditions and more susceptible to undesirable changes (Millar 2007).

To restore and maintain the landscape, silvicultural means should be used to modify and rejuvenate the forested landscape in the analysis area. Improvement cuttings, partial openings, commercial thinning, release treatments, and fuels reduction are types of silvicultural methods that can improve landscape health, reduce the risk of insect mortality and wildfire, begin to provide a range of structures for the long term, release potential of the sites, and alter species composition (Millar 2007, Kimbell 2007, Policy Statement 2007, Brown 2008, Strategic Framework 2008).

Treatments in stands, especially in the understory reinitiation stage, will anchor habitats of late and old structure across the landscape. There are several factors in the East Face Analysis Area that affect overall landscape health such as stand density, structures and species composition. These factors are major silvicultural concerns to implementing the Wallow-Whitman Forest Plan and ecosystem management.

## **Effects Analysis**

Alternatives Considered:

**Alternative 1:** This alternative is the no action alternative and is consistent with NEPA regulations.

**Alternative 2:** This alternative is designed to alter stand densities, structures, and compositions to improve overall tree vigor and ability of trees to withstand forest pests, insects, and drought. This alternative treats stands to improve fire resistance, improve tree vigor and growth, reduce competition, and minimize losses to insect and disease mortality.

**Alternative 3:** This alternative is designed to respond to comments from scoping. In general, commercial treatments in late and old structure (LOS) below range of variation (ROV), road reconstructions, regeneration treatments and temporary roads were removed from Alternative 2.

**Alternative 4:** This alternative is designed to respond to comments from scoping. In general, only Priority 1 areas receive commercial treatments, Priority 2 has only non-commercial treatments and Priority 3 has no treatments in Moist/Cold PVG units.

**Alternative 5:** This alternative is designed to respond to comments from scoping. In general it is similar to Alternative 2 but also considers commercial removal of biomass from non-commercial units.

**Table 2 - Summary of Acres Treated and Volume Harvested**

ALT	Total Acres	Volume (MMBF)	Prescriptions (Acres)							
			HPO	HSA	HIM	HTH	HPR	HSB	NCT*	HFU
1	0	0	0	0	0	0	0	0	0	0
2	17,098	21.9	143	210	2,200	3,563	43	318	10,376	245
3	13,654	12.5	0	62	1,198	2,437	43	0	9,775	139
4	16,500	9.0	0	122	1,255	1,154	38	120	13,656	155
5	18,036	26.3	143	210	2,886	3,816	43	318	7,815	245

\*NCT = total of Non-commercial treatments (precommercial thinning, whipfelling by hand, mechanical whipfelling/mastication, and fuels reduction (FFU))

The key indicators for analysis of long term forest health are:

- Acres of overstocked stands treated within the project area
- Percent of overstocked stands treated within the project area
- Acres where species composition are trending towards HRV for species composition

Stand and landscape attributes such as density and species composition that are within the historic range of variability will assist in making the landscape more resilient and resistant to disturbances. Over the last century shifts in species composition and density have created vegetative conditions where insects, diseases, and wildfire may operate in uncharacteristic levels (Morgan and Parson, 2001).

Following are the silvicultural effects of the alternatives for the East Face Analysis Area.

## **DIRECT AND INDIRECT EFFECTS**

### **Alternative 1 -- No Action**

Stands proposed for treatment under the action alternatives either have a considerable percentage of existing basal area in “non-releasable” suppressed and intermediate trees or stand density index (SDI) values which exceed the LMZ levels. Existing suppressed and intermediate crown class trees within stands proposed for density management in the action alternatives below exhibit crown ratios well below 30 percent. In addition, roughly 10-20 percent of the codominant trees also display poor crown ratios. In the absence of density management, these stands would continue to exhibit poor growth rates and crown loss due to overstocking (Cochran et.al 1994, Wyckoff et.al. 2005, Fettig et.al. 2007) and have a higher predisposition to bark beetle attacks (Cole 1988, Scott 1996, Krist et.al. 2007).

Under this alternative no stands would be treated; therefore, stocking levels, species compositions, and structural stages would remain unchanged. Alternative 1 would do nothing to mitigate the accumulation of fuels or restore ecosystem sustainability that includes the re-establishment of inherent disturbance regimes.

Fire behavior indicated by rate of spread and intensity will remain unchanged until a wildfire occurs. There will be an increased risk of high-intensity wildfire through continued build-up of dead fuels. In addition to killing surviving trees and other vegetation, intense wildfire can damage the site and contribute to severe scouring of streams during peak run-off events. With this alternative an increase in multi-layering within stands and susceptibility to crown fires, spread of root diseases, dwarf mistletoe and risk of future tussock moth and western spruce budworm defoliation is anticipated. Objectives of maintaining healthy and vigorous stands capable of resisting successful insect and disease attacks would not be realized.

### **Cold Upland Forests**

This group is very susceptible to fires and can sustain stand replacement fires. Lodgepole pine, which in many areas is a major component of this type, is susceptible to mountain pine beetle infestation which is becoming a serious problem. There is an ongoing increase of balsam wooly adelgid affecting the subalpine fir in this vegetation group. Under this alternative over 80% of this forest type would remain with high stocking densities (Appendix 1- Stocking) and while the amount of grand fir would be over-represented the amount of western larch would be under-represented (Appendix 2-Cover Type).

### **Moist Upland Forests**

In moist upland forests, density related mortality will continue to increase and much of the understory component will be suppressed. Many of these stands will remain in a condition of low vigor which increases the risk of insect and disease attack or damage and reduces growth potential. Competition will also have a negative effect on the vigor of larger stand components contributing to increased mortality. Fire and insect/disease risks would not be reduced. Under this alternative, stands in the group would experience an increased spread of insect and disease (particularly root disease) damage and wildfire. Without introducing some partial openings into the stands the movement towards more seral species will be delayed until a stand disturbing event creates conditions that enable seral species to develop. Under this alternative over 60% of this forest type would remain with high stocking densities (Appendix 1) and while the amount of grand fir would be over-represented the amount of Douglas-fir and ponderosa pine would be under-represented (Appendix 2).

### **Dry Upland Forests**

In these stands, fir would continue to occupy parts of the stands reducing the regeneration of seral species. Without some type of disturbance these stands would continue to have an excessive fir component not historically present in this vegetation group. If left untreated these stands would continue to exhibit reduced growth rates and become more susceptible to diseases and insects. Fire and insect/disease risks would not be reduced and fuel loadings would continue to be excessive and contribute to higher fire intensities than those that would have occurred historically. Under this alternative over 70% of this forest type would remain with high stocking densities (Appendix 1) and while the amount of grand fir, lodgepole and Douglas-fir would be over-represented the amount of ponderosa pine would be under-represented (Appendix 2).

This alternative would result in a continued decline in overall forest health as described by stand and tree health as well as, an increase in potential fire intensities. Overstocked stands would continue to be selected for haphazard stocking reduction by future insect outbreaks. The dry upland forests would continue to be in an overstocked, low vigor condition. The risk of losing these stands to mountain or western pine beetle would increase. Additional growth to trees would not be realized and movement towards larger diameter trees delayed. Moist upland forests would continue to be at risk to insect/disease damage and stand replacement fires. The desired future health and sustainability of the forest is not considered with this alternative. In all vegetation groups when species composition is outside of historic ranges as described

above, resiliency is reduced making the landscape less resistant to disturbances such as insects, diseases, wildfire, and climate change impacts.

### **Action Alternatives**

Alternatives 2-5 are a combination of sanitation/salvage, partial openings, commercial thinning, improvement harvests, shelterwoods, release treatments, fuels reduction activities, prescribed fire, and artificial and natural regeneration. Of the 47,636 acre project area approximately 44,620 acres are forested (94% of the project area). There are 12,534 acres in reserved lands such as allocated old growth, inventoried roadless, and riparian buffers. Of the non-reserved forested acres, 9,121 acres (28% of the available forested acres) have received a commercial entry and 2,991 acres have had a non-commercial treatment in last 35 years. (Table 3)

**Table 3 - Percentage of Treatments Across the Planning Area**

<b>Alternatives</b>	<b>Total Acres Treated</b>	<b>% of Total Available Acres Treated</b>	<b>Commercial Acres Treated</b>	<b>% of Available Acres Treated in East Face-Commercial</b>	<b>% of Available Acres Treated in Project Area-Commercial Last 35 Years</b>
1	0	0	0	0	28
2	17,098	53	6,722	29	57
3	13,654	43	3,879	17	45
4	16,500	51	2,844	12	40
5	18,034	56	10,221	45	73

Where applicable, action alternatives would create conditions that:

- favor establishment of multi-storied stands or
- favor establishment of larch and pine
- remove ladder fuels and reduce crown densities
- reduce densities and alter species composition

Reforestation is expected to occur more quickly with the action alternatives, due to reforestation activities such as planting and adequate site preparation in comparison to the no action alternative. Created openings would remain for 10-15 years in treated stands. Woody debris would be left on the site to contribute to the nutrient cycling (long term site productivity) and enhancement of small mammal habitat. Stands not treated in the action alternatives would experience similar effects to those described in Alternative 1.

Tree density classes are expected to change in response to implementation of silvicultural activities proposed for the action alternatives. Implementing the silvicultural activities is expected to cause a consistent reduction in tree density for the treatment units to either the moderate or low density condition after implementation. Ten percent of the pre-implementation acres for medium and high density classes will remain in their density classes. (Table 4)

Tree density classes are defined as follows:

- Low Tree Density – are densities generally within the lower management zone for the species within each PVG.
- Medium Tree Density – are densities generally between the lower and upper management zones for the species within each PVG.
- High Tree Density – are densities generally near or above the upper management zones for the species within each PVG.

**Table 4 – Pre- and Post-Treatment Tree Densities for Alternatives 2-5**

Alternatives	Tree Density Class	Pre-Implementation		Post-Implementation		Difference Acres
		Acres	Percent	Acres	Percent	
2	Low	624	4	8,782	51	+8,158
	Medium	4,178	24	7,072	41	+2,894
	High	12,280	72	1,228	8	-11,052
3	Low	615	5	7,145	52	+6,530
	Medium	3,699	27	5,568	41	+1,869
	High	9,332	68	933	7	-8,399
4	Low	606	4	8,399	51	+7,793
	Medium	3,586	22	6,858	42	+3,272
	High	12,294	74	1,229	7	-11,065
5	Low	625	3	9,200	51	+8,575
	Medium	4,205	23	7,480	42	+3,275
	High	13,167	73	1,317	7	-11,850

Alternative 5 treats 37% of the overstocked stands within the project area while Alternatives 2 and 4 treat 34% and Alternative 3 treats 26%. Treated acres will move into the Low to Medium tree density classes reducing competition for site nutrients and improving tree vigor in the mid-term (15-20 years).

Plant species occur in either pure or mixed communities called cover types. Cover type species identified in Table 5 reflect the majority or plurality of tree species abundance. Species composition, as represented using forest cover types, is expected to change in response to implementation of silvicultural activities proposed for the action alternatives. Most of the forest cover types affected by implementation of silvicultural activities are late-seral (grand fir and spruce-fir), and they are decreased as an effect of implementation; early- or mid-seral cover types (ponderosa pine, Douglas-fir, and western larch) are either enhanced or established by these alternatives, so they are increased as a consequence of implementing the action alternatives (Table 5).

**Table 5 - Change in Cover Type by Alternative**

Alternatives	Cover Type	Pre-Implementation		Post-Implementation	
		Acres	Percent	Acres	Percent
2	Grand Fir	6,085	36	1,537	9
	Subalpine Fir & Englemann Spruce	1,545	9	119	1
	W. Larch	2,086	12	5,434	32
	Lodgepole Pine	3,437	20	3,226	19
	Ponderosa Pine	1,206	7	2,502	15
	Douglas-Fir	2,739	16	4,280	25
3	Grand Fir	4,111	30	830	5
	Subalpine Fir & Englemann Spruce	1,005	7	37	0
	W. Larch	2,057	15	4,276	32
	Lodgepole Pine	2,814	21	2,632	19
	Ponderosa Pine	1,186	9	2,211	17
	Douglas-Fir	2,481	18	3,668	27
4	Grand Fir	5,455	33	837	5
	Subalpine Fir & Englemann Spruce	1,133	7	208	1
	W. Larch	2,139	13	4,975	30
	Lodgepole Pine	3,513	21	3,79	21
	Ponderosa Pine	1,118	7	2,550	15
	Douglas-Fir	3,072	19	4,450	27
5	Grand Fir	6,790	38	1,951	11
	Subalpine Fir & Englemann Spruce	1,169	6	274	2
	W. Larch	2,162	12	5,338	30
	Lodgepole Pine	3,667	20	3,437	19
	Ponderosa Pine	1,206	7	2,660	15
	Douglas-Fir	3,040	17	4,374	24

**Table 6 – Summary of Percent Cover Changed to Seral in the East Face Project Area**

Alternative	Commercial	Non-Commercial	Total Acres Moved	Percent Upland Forest Moved
2	6,722	10,376	16,073	37
3	3,879	9,775	12,802	29
4	2,844	13,656	15,632	36
5	10,219	7,815	17,134	40

### **Cold Upland Forests**

Intermediate treatments would remove suppressed trees and those with poor live crown ratios (LCR) (generally trees with less than 30-40% LCR) and reduce basal area to an desired stand densities.

Shelterwood harvest are in stands that have high amounts of insect and disease, few trees with greater than 30-40% live crown ratios, and severely suppressed understories. With a shelterwood harvest, the primary objective is to move the stands towards more seral species. Partial opening harvests are part of a 90 acre stand with four openings, 8 acres total. This stand is predominately lodgepole pine. The objective in this stand is to create holes that will promote early successional structure and early seral species such as western larch, western white pine as well as creating some heterogeneity.

The species composition in the cold upland forests are a mix of species and size classes with grand fir, subalpine fir, Englemann spruce, and lodgepole pine dominating the composition with poles to medium size diameter trees. Understories are dominated by grand fir, subalpine fir, Englemann spruce and lodgepole with twinflower and big huckleberry. Insects and diseases observed in these stands include adelgids, several root rots, mountain pine beetle, indian paint fungus, fir engraver, and mistletoes. Mortality in many stands is less than 10% of the overstory with many of the intermediate size class trees exhibiting live crown ratios less than 30% and poor vigor.

Treatments would create a change in fire behavior by reducing the rate of spread and intensity and reduce standing and down dead fuels and ladder fuels. Treatments would reduce the risk of insect/disease problems and provide for altered fire behavior for 20-30 years.

### **Moist Upland Forests**

The species composition in the moist upland forests are a mix of species and size classes with grand fir, Englemann spruce, western larch, subalpine fir, and lodgepole pine dominating the composition with poles to large size diameter trees. In the overstory there is also some Douglas-fir and ponderosa pine. Understories are dominated by grand fir and lodgepole with twinflower and big huckleberry. Insects and diseases observed in these stands include several root rots, mountain pine beetle, indian paint fungus, fir engraver, balsam woolly adelgid, and mistletoes. Mortality in many stands is less than 10% of the overstory with many of the intermediate size class trees exhibiting live crown ratios less than 20% and poor vigor.

Reducing stand densities by improvement cuttings, thinnings, sanitation, shelterwoods, partial openings, and fuels treatments will enhance stand and landscape health. Sanitation will provide for regeneration to develop with non-susceptible hosts. Improvement harvests, thinnings and fuels treatments will reduce densities and provide for a more vigorous and healthy stands. Shelterwood harvest are in stands that have high amounts of insect and disease, few trees with greater than 30-40% live crown ratios, and mostly suppressed understory. With a shelterwood harvest, the main objective is to move stands towards more seral species which are underrepresented on the landscape leaving the existing stands an overstocked monoculture which places them at a higher risk to insect and disease attack.

Partial opening harvests are in stands that are predominately lodgepole pine with some associated species, the objective in these stands is to take approximately 10% of the stand and create small holes that will promote early successional structure and early seral species such as western larch, western white pine as well as creating some heterogeneity in stands. Patch treatments would create forests with canopy openings that reflect fine-scale disturbances and increase resilient to insects, disease, wildfire and climate change (Jain, 2008). Early seral species, such as western white pine and western larch are long lived species that can regenerate and persist in patches (Kolb 2004). Proposed treatments will create conditions that will encourage higher amounts of early and mid-seral trees species (western white pine, western larch, ponderosa pine) and decrease the amount of grand fir, lodgepole pine, and subalpine fir. Western larch and western white pine will lose dominance to shade tolerant species in partial shade (Fowells, 1965). The overall objective is to reduce the amount of suppressed trees, ladder fuels, mistletoe infected western larch and increase the amount of western white pine, western larch, and ponderosa pine. Treatments will maintain dominates and co-dominates with 30-40% live crown ratio and reduce basal area to 40 square feet/acre. These treatments will produce visible sky that will enable western white pine and western larch to be competitive. Western white pine maintains a competitive advantage with greater than 50% visible sky and is free to grow at 92% visible sky when density is reduce to less than 66 square feet of basal area per acre (Jain, 2008). Growth can be sacrificed if openings are less than 10 acres but western white pine can persist in these small openings (Jain, 2008).

Treatments would cause a change in fire behavior by reducing the rate of spread and intensity and would reduce standing and down dead fuels and ladder fuels. Treatments will alter the amount of grand fir in the stand and promote more seral species. In moist upland forest, grand fir was typically 15-30% of the stand composition (Schwalbach 2011) currently, grand fir is the majority in 52% of the stands is this potential vegetation group.

### **Dry Upland Forests**

Treatments in this type would provide more disease resistance and structures more consistent with natural disturbance regimes (Schmidt 1994; Scott 1996; Schowalter and Withgott 2001). Many of these stands would begin to provide more open conditions dominated by ponderosa pine, Douglas-fir, and western larch. The effects of potential climate-induced change will be minimized by reducing densities and minimizing grand fir. Post harvest burning of these stands would play an important role in maintaining them. Density levels, as well as, the amount of understory in the stands would be reduced as burning is conducted. Treatments would reduce the risk of insect/disease problems and provide stocking control for 20-30 years.

Natural underburning conducted in fire-dependent ponderosa pine and fire-tolerant mixed conifer stands will help to perpetuate natural disturbance regimes.

Two major changes expected from climate change are more severe fire and extensive outbreaks of insects and diseases (Brett, 2008). Climate change is elevating the level of insect and disease caused mortality and impacting the size and extent of wildfires. In response to those changes the strategy is to develop more resilient and resistant forests. Changing species composition from one susceptible to insects and diseases and fire to one more resistant and resilient will provide for sustainability of forests. A healthy forest has a majority of trees that are vigorous and resistant to insects and disease and have the ability to sustain itself when affected by wildfire. Treatments would provide for altered fire behavior for 20-30 years.

### **SUMMARY**

The overstocked stand conditions can have a major effect on landscape health and attaining the desired future condition (DFC) for the East Face Analysis Area. In a healthy landscape there are areas of high density and low vigor, but to develop the DFC for much of the area, many of those stands need to be treated. To move

towards a more healthy stand and landscape condition forest management needs to occur. Alternative 1, leaves the landscape in its current condition and carries with it a high risk of stand and landscape decline. Alternatives 2-5 would reduce densities, alter stand compositions and provide for a more sustainable landscape. Alternatives 5, 4, and 2 move the most acres toward low to moderate tree densities (Table 4); however, because Alternative 4 would non-commercially treat more of the managed acres than Alternatives 2 and 5, it would have more acres at the medium to high stocking densities due to removal of the small understory trees and retention of more overstory trees. Non-commercially treated stands in Alternative 4 would require another entry to manage stocking densities within the next 5-8 years whereas Alternatives 2 and 5 would hold for a longer period of time before further density management is needed to maintain stand health and vigor. Alternative 3 would have the least number of acres into low to medium tree density classes.

Alternatives 5 and 2 would have the highest species composition percent change (40% and 37%) toward more resilient seral species than Alternatives 3 and 4 (29-36%) (Table 6). Stand species compositions that are within the historic range of variability assist in making the landscape more resilient and resistant to disturbances. Over the last century shifts in species composition and density have create vegetative conditions where insects, diseases, and wildfire may operate in uncharactiristic levels (Morgan and Parson, 2001). Stand management in the East Face action alternatives would be a start toward creating a more resilient landscape by managing stand densities, species composition, and creating some heterogeneity in homogeneous areas.

As management occurs, the desired future condition of the area is to use the natural disturbance regime as a template to provide for a structure, density, and species composition mix across the landscape that is sustainable. This mixture will provide a degree of diversity for big game and other wildlife and a level of wood fiber and forage production.

## **COMMON EFFECTS**

Common to most harvest units are Pacfish no-harvest buffers. Many of the no-harvest buffers have adequate regeneration, healthy trees and minimum amounts of mortality. Long term implications of these no-harvest buffers are minimized by site conditions. However, some density related mortality is expected and should provide for riparian needs.

In most units snag levels will be met by retaining all existing snags. Maintaining these snags should have no adverse silvicultural effects.

Connective corridors will be maintained in the planning area. Corridors have certain requirements about distance and canopy closure. Stands treated with corridor requirements will tend to have higher densities and tree numbers that will increase density mortality, be less vigorous, and be at higher risk to fire damage.

Enhancement and KV projects and mitigation measures are part of all action alternatives, silvicultural effects of each follow:

- 1) Release Treatments (Non-commercial Thinning): will have positive silvicultural effects by reducing competition, increasing growth rates and helping to maintain species composition.
- 2) Road Closure/Rehabilitation: no adverse silvicultural effect.
- 3) Prescribed Burning and Mechanical Fuels Reductions: burning and fuels reduction treatments will provide for additional openings within stands to assist natural and artifical regeneration and reduce the possibility of a fire damaging the residual stand.

4) Planting: will have positive silvicultural effects by providing: regeneration in stands that have few viable seedlings or saplings, structural component that is lacking in some stands, and tree densities at appropriate numbers.

5) Fire Fuels Reduction (FFU): biomass removal of down and suppressed material will have positive silvicultural effects by reducing the risk of future fires with the chance of a stand replacing event.

## Cumulative Effects on Forest Health and Sustainability

As can be seen in Table 7, the East Face project area is severely deficit in OFSS in all PVGs and slightly below HRV in moist OFMS and SE. It is also below HRV in stand initiation (SI) in both moist and cold PVGs. The area is also well above HRV in all PVGs in understory reinitiation (2-5 times above the upper HRV ranges).

**Table 7 – East Face Existing Stand Structure and HRV by PVG**

PVG	Existing Acres	% of PVG	Historical Range %
<b>Old Forest Multi Stratum (OFMS)</b>			
moist upland	2,277	12%	15-20%
dry upland	929	10%	5-15%
cold upland	2,574	16%	10-25%
<b>Old Forest Single Stratum (OFSS)</b>			
moist upland	27	0%	10-20%
dry upland	257	3%	40-60%
cold upland	392	2%	5-20%
<b>Understory Reinitiation (UR)</b>			
moist upland	11,275	59%	10-20%
dry upland	4,515	51%	5-10%
cold upland	7,175	45%	10-25%
<b>Stem Exclusion (SE)</b>			
moist upland	3,498	18%	20-30%
dry upland	1,795	20%	10-20%
cold upland	2,466	15%	10-30%
<b>Stand Initiation (SI)</b>			
moist upland	1,928	10%	20-30%
dry upland	1,412	16%	15-25%
cold upland	2,893	18%	20-45%

Treatments proposed in the East Face action alternatives restore some OFMS to OFSS stand structure (refer to analysis in the Wildlife Effects Analysis) and accelerates UR toward OF structure (5,464 acres in Alternative 2; 5,464 acres in Alternative 3; 6,860 acres in Alternative 4; and 7,713 acres in Alternative 5). Alternatives 2, 4, and 5 also convert some UR (89-328 acres) stands to SI which is below HRV, while Alternative 3 does not create any SI due to the use of intermediate harvests only. These changes in stand structure in combination with the thinning being accomplished in the Elkhorn Wildlife Area, the Limber

Jim/Muir area, and the Ladd Canyon/RMEF area will contribute not only to landscape health and sustainability but also accelerate stands toward HRVs for all stand structures at the landscape level.

Prescribed fire within all of these project areas including East Face will reduce the number of suppressed seedlings competing for site resources at the landscape level and improve stand health and sustainability. Thinning and fuel reduction activities on adjacent private lands would contribute to improving landscape resiliency and vegetative health reducing the potential susceptibility to insect and disease epidemics that can begin on any ownership and spread to adjacent ownerships.

### **Forest Plan Compliance**

Alternatives 2-5 comply with the goals for timber in the 1990 Wallowa-Whitman National Forest (WWNF) forest plan as amended by providing for production of wood fiber to satisfy National needs and benefit local economies consistent with multiple resource objectives, environmental constraints, and economic efficiency. Opportunities for fuelwood gathering for personal and commercial uses would be available within the project area. These alternatives meet the forest plan standards and guidelines for timber because prescriptions have been prepared and reviewed by a certified silviculturist, meet the silvicultural needs of the stands being treated including stand structure and species composition, limit created opening sizes, utilize the appropriate yarding system for stand and ground conditions, and call for precommercial thinning of young stands to accelerate their growth. All action alternatives also propose to harvest timber only on lands suitable for timber management.

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## APPENDIX 1

Appendix XX provides “trees per acre” database queries for three tree density categories (low, moderate, high), three stand size classes (seedlings/saplings, poles, small+ trees) and three potential vegetation groups.

Numbers derived using Powell(2013)

PVG	Diameter (inches)	Densities (Acres)			ROV %		
	QMD	LOW	MOD	HIGH			
COLD	<=3	466	567	6737	LOW	MOD	HIGH
	4-7	528	728	3619	15-35	20-40	25-60
	>7	122	43	2643			
	TOTALS	1116	1338	12999			
		7%	9%	84%			

PVG	Diameter (inches)	Densities (Acres)			ROV%		
	QMD	LOW	MOD	HIGH			
Moist	<=3	1577	2332	5658	LOW	MOD	HIGH
	4-7	919	1027	5308	20-40	25-60	15-30
	>7	427	537	1172			
	TOTALS	2923	3896	12138			
		15%	21%	64%			

PVG	Diameter (inches)	Densities (Acres)			ROV%		
	QMD	LOW	MOD	HIGH			
DRY	<=3	479	343	1274	LOW	MOD	HIGH
	4-7	264	115	4063	40-85	15-30	5-15
	>7	445	182	1710			
	TOTALS	1188	640	7047			
		13%	7%	79%			

PVG= Potential Vegetation Group, ROV=Range of Variation

Current amounts are summarized from the East Face vegetation database (forested lands only).

Powell, David C. (2013) *Stand Density Protocol for Mid-Scale Assessments*. White Paper F14-SO-WP-Silv-36. Pendleton, Or: USDA Forest Service, Pacific Northwest Region, Umatilla National Forest.

## Appendix 2

Appendix XX provides species composition in the Easface planning area. Because species composition varies by potential vegetation group environment, the HRV analysis was stratified by potential vegetation group.

	Cover Type	ACRES	%	ROV%
PVG Cold		6		
	ABGR	5105	32	5-15
	ABLA/PIEN	3377	21	15-35
	LAOC	316	2	5-15
	PICO	6358	40	25-45
	PIPO	136	1	0-5
	PSMEG	704	4	5-15

	Cover Type	ACRES	%	ROV %
PVG MOIST		33		
	ABGR	9940	52	15-30
	ABLA/PIEN	1893	10	1-15
	LAOC	2785	15	10-30
	PICO	3019	16	10-25
	PIPO	429	2	5-15
	PSMEG	883	5	15-30

	Cover Type	ACRES	%	ROV %
PVG Dry	Unknown	48	1	
	ABGR	1444	16	1-10
	ABLA/PIEN	86	1	0
	LAOC	741	8	1-10
	PICO	904	10	0-5
	PIPO	1645	19	50-80
	PSMEG	4008	45	5-20

PVG= Potential Vegetation Group, ROV=Range of Variation

Current amounts are summarized from the East Face vegetation database (forested lands only).